UWI.COM
THE INTERNET FORMS COMPANY

Conducting E-Business in the Internet Age

Jason Nadeau, Senior Systems Engineer
NIST
August 12, 1999

Copyright UWI.COM - All Rights Reserved

UWI.Com - Our History

- Founded in 1993
  - **Initial research at the University of Victoria**
  - **Offices in Victoria, San Franciso, and Los Angeles**
- Initial customers OEM contracts
  - **Ameritech and Unisys**
- 1996: InternetForms System
  - **Productize the OEM technology**
  - **Build Sales and Marketing**
  - **Launch Product: '97 Fall InternetWorld, NY**
- 1998: InternetWorld - Best of Show
- 1999: InternetWeek - Top 10 E-Commerce Co.

The Goal of InternetForms

The XML-based InternetForms Suite web-enables high-value business-to-business commerce through interactive, highly secure, legally binding, processable digital documents that effectively remove physical paper and its associated cost from the business value chain.

Objectives

- **Reduce the Total Cost of Ownership (TCO)**
- **Eliminate paper at its source**
- **Enable the digital office / e-business**
- **Provide long-term transaction “provability”**
- **Increase responsiveness**
- **Foster more effective business partnerships**

Business Transactions

- Acts of commerce are composed of a series of agreements (purchase orders, invoices, etc…)
- Documents are used to embody these agreements.
- Over 80% of these business documents are forms. (Gartner)
- Digital replacements for these documents are necessary to conduct E-Business.

How?

- Digital documents equivalent to paper
  - The InternetForms Suite of products
  - Digitally signable
  - Interoperable, processable
  - Based on an Open Standard (XFDL)
- Seamless integration into back-end systems
  - Merging of client-side products
    - Imaging, Workflow, Groupware
  - Direct support for XFDL documents
    - e.g. routing, searching
  - Transactions effectively “imaged” natively

Forms as Documents

- **Forms are more than just data**
- **Forms are composed of two pieces:**
  - **Presentation**
    - **“Questions”**
  - **Data**
    - **“Answers”**

XML - A Primer

"By 2002, XML components and standards will be the nucleus of Web information management."

-- META Trends 1999/2000

- Extensible Markup Language
  - **A meta-language specification**
  - **Used to define languages for specific purposes**
- Designed to facilitate information sharing:
  - **Defines a highly structured, extensible data structure.**
  - **Provides a syntactic base for sharing tagged data**

XFDL Overview

- XFDL is an XML language
- XFDL is the world's first protocol for legally-binding XML transaction documents
- Co-authored by UWI.Com and Tim Bray (co-editor of XML)
- Submitted to W3C and CommerceNet for consideration as an Internet standard
- Designed for B2B e-commerce
  - **Ideally suited for cXML, CBL and BizTalk applications**

XFDL - Verifiable Documents

- XFDL provides future provability by storing the content, context, and structure of a transaction record in a single, signed and secure file
- XFDL replaces paper in the business process
- Legal experts validate this approach, and have stated that existing Internet solutions (HTML, Java, XML) are not adequate.

Auditability

- Data collection - traditional IS approach
  - Data is important
  - Use only the presentation that is relevant for the data set
- Contractual documents
  - Storing only the data (answers) is not enough
  - Must store the presentation (questions) or context as well
- Examples
  - The answer “Yes” is only useful if you know the question was “Are you married?”
  - Text size, compliance with industry regulations
  - Being able to even read the text (white on white)
- “Self-Service Web Applications May End in Disservice” - Aberdeen Group, Dec. 5, 1997

XFDL - Verifiable Transactions

- When a user fills and submits an HTML form, only the input data (content) is sent to the server, where it usually becomes fields in a database
- The HTML form (context and structure) itself is maintained as a separate HTML file
- Submitting an HTML form separates the content from the context and structure, so the transaction record does not offer auditability

XFDL - Other Benefits

- XFDL can create complex, highly interactive interfaces which can reduce or eliminate user errors
- Rich semantics: precision layout, integrated computations, input validation, digital signatures, and verifiable transaction records
- XFDL forms are open - critical business data is not locked up in a proprietary format
- XFDL has been endorsed or is supported by leading e-commerce vendors including:
  - CommerceOne, webMethods, Bluestone, Entegrity, Metastorm, PenOp, GTE CyberTrust, Optika, Action Technologies, enCommerce, CACI, Innovative Workflow Engineering

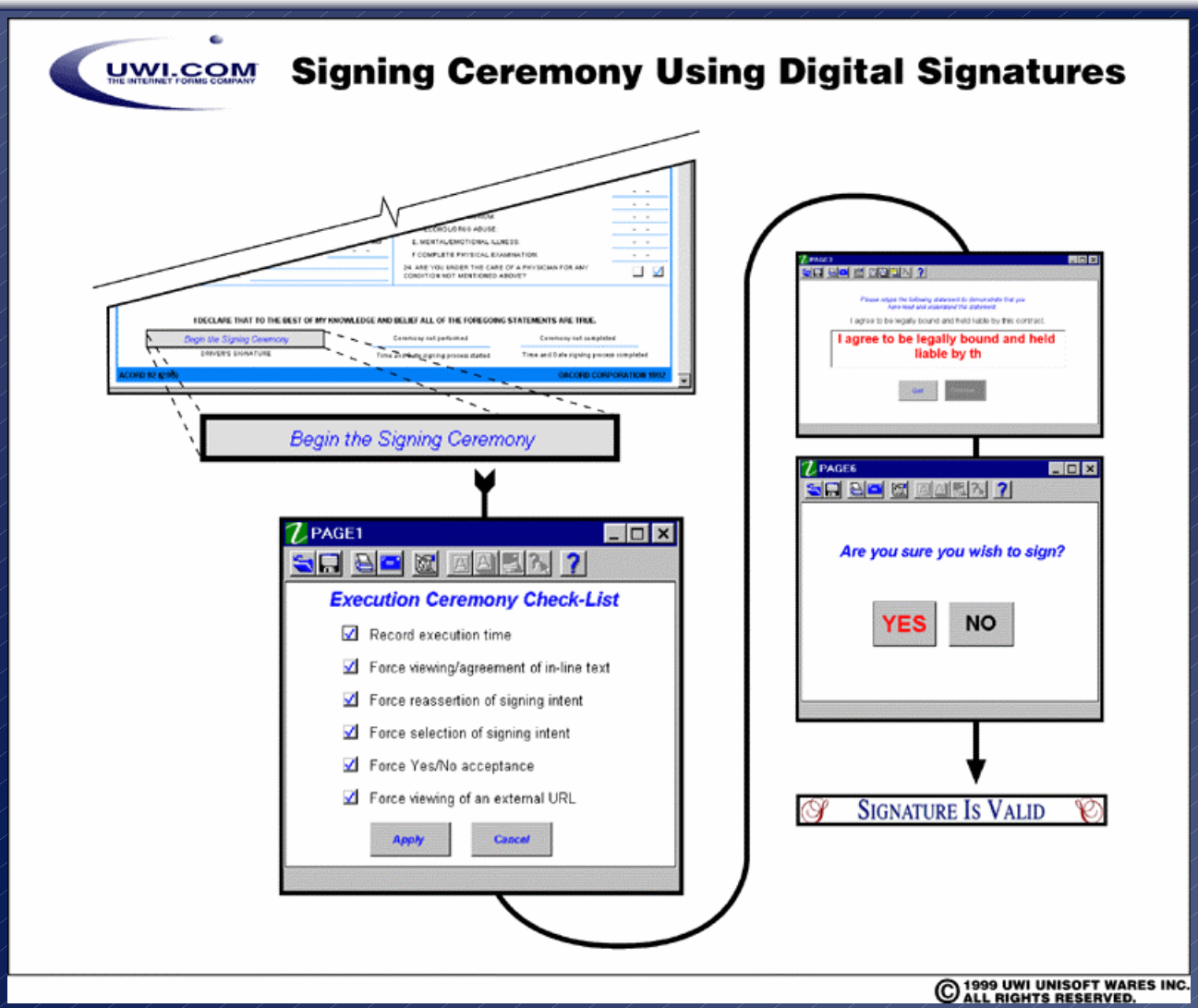
Security - Digital Signatures

- Range of signature options
  - Pen-based
  - Certificate-based
  - Card-based
- Digital signatures vs. electronic signatures
  - RSA security vs. “homegrown solutions”
- RSA: Industry standard and government accepted
  - e.g. Microsoft Crypto-API, Netscape NSS
- PKI providers: VeriSign, Entrust, GTE Cybertrust
- Signing “Intent” - Signature alone is not enough
  - Ceremony is key

Legal Requirements

- **Accuracy of Record**: Should be reproducible as viewed and created by originator
- **Authenticity of Record**: Need for electronic signature such as digital signature, dynamic signature, and/or simple ID
- **Completeness of Record**: Content, Context, and Structure in one complete record
  - "Electronic Commerce Forms: Requirements, Issues, and Solutions", Cohasset Associates, Inc.
- **Independent Validation:** Open Systems

Security - Digital Signatures



XFDL - The Signature Difference

WHICH WOULD YOU PREFER TO SIGN?

JACOB BROWN	123-89754-23	*******	*******
ANTONIO LUIGI	000-689-99958-1	*******	*******
IBM	(IBM)	10,000	X

• DATA CONTENT •

Mountain-Sure Investing B769879-C2

BROKERAGE TRANSACTION

CLEAR SAVE

CLIENT NAME	ACCOUNT NUMBER	PASSWORD	CONFIRM PASSWORD
JACOB BROWN	123-89754-23	*******	*******

BROKER NAME	LICENSE NUMBER	PASSWORD	CONFIRM PASSWORD
ANTONIO LUIGI	000-689-99958-1	*******	*******

INVESTMENT/STOCK	SYMBOL	QUANTITY OF SHARES	BUY	SELL
IBM	(IBM)	10,000	X	

APPLY DIGITAL SIGNATURE SUBMIT

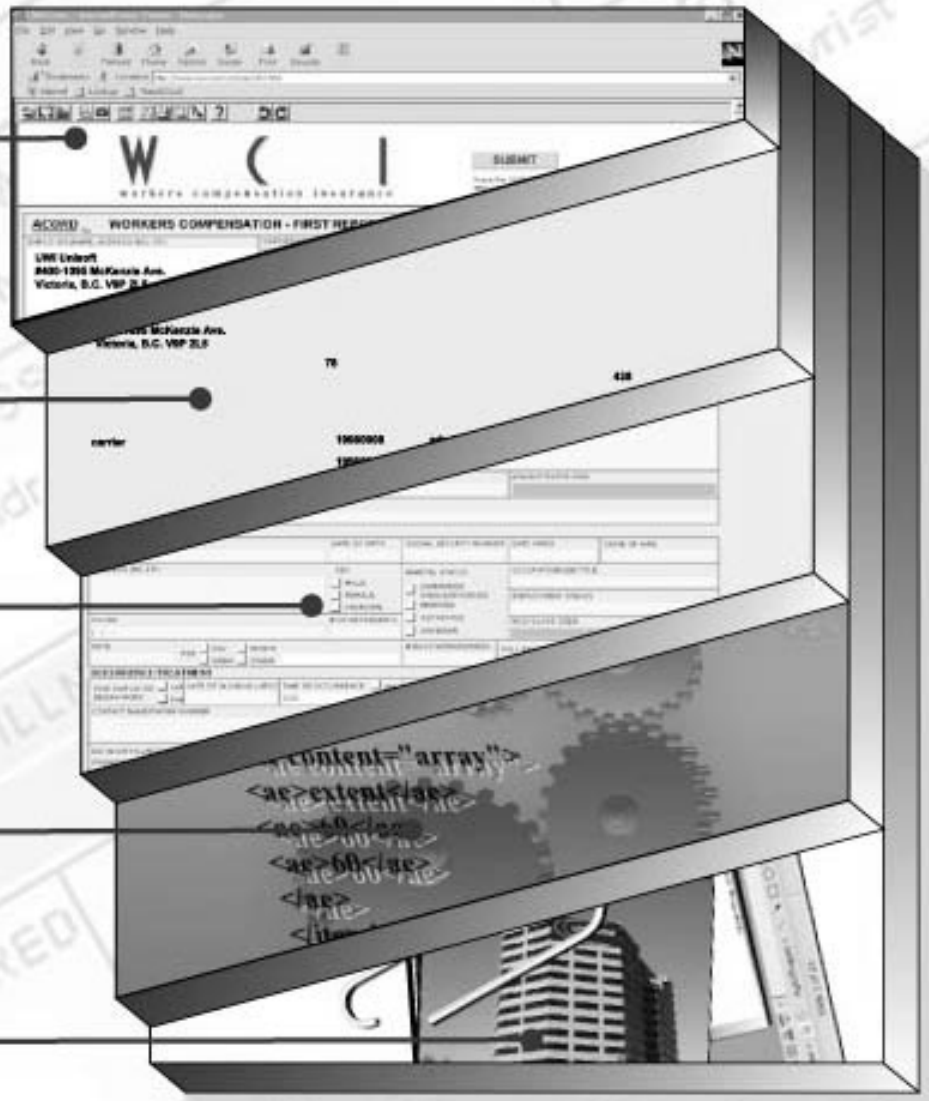
• DATA CONTENT • CONTEXT • STRUCTURE • ATTACHMENTS •

DIGITALLY SIGNED ELEMENTS of an INTERNETFORM

AN INTERNET FORM CONSISTS OF LAYERED ELEMENTS.

WHEN THE FORM IS DIGITALLY SIGNED, EVERY ELEMENT IS SECURED.

ELEMENTS INCLUDE:



Viewer Capabilities

- Multiple signatures
  - Support for both nested and non-nested signatures
    - e.g. witnessing
  - A signature can sign any set of a document
  - CRL verification through local CSPs (CAPI, Entrust etc.)
  - Deletions allowed as matter of policy
  - Signatures (and public certificate) included in document
- Hardware tokens
  - e.g. Smartcards, bio-metric readers
- Document attachments
  - File-folder-like capability - can add arbitrary files
  - Included in signatures

Viewer Capabilities (cont).

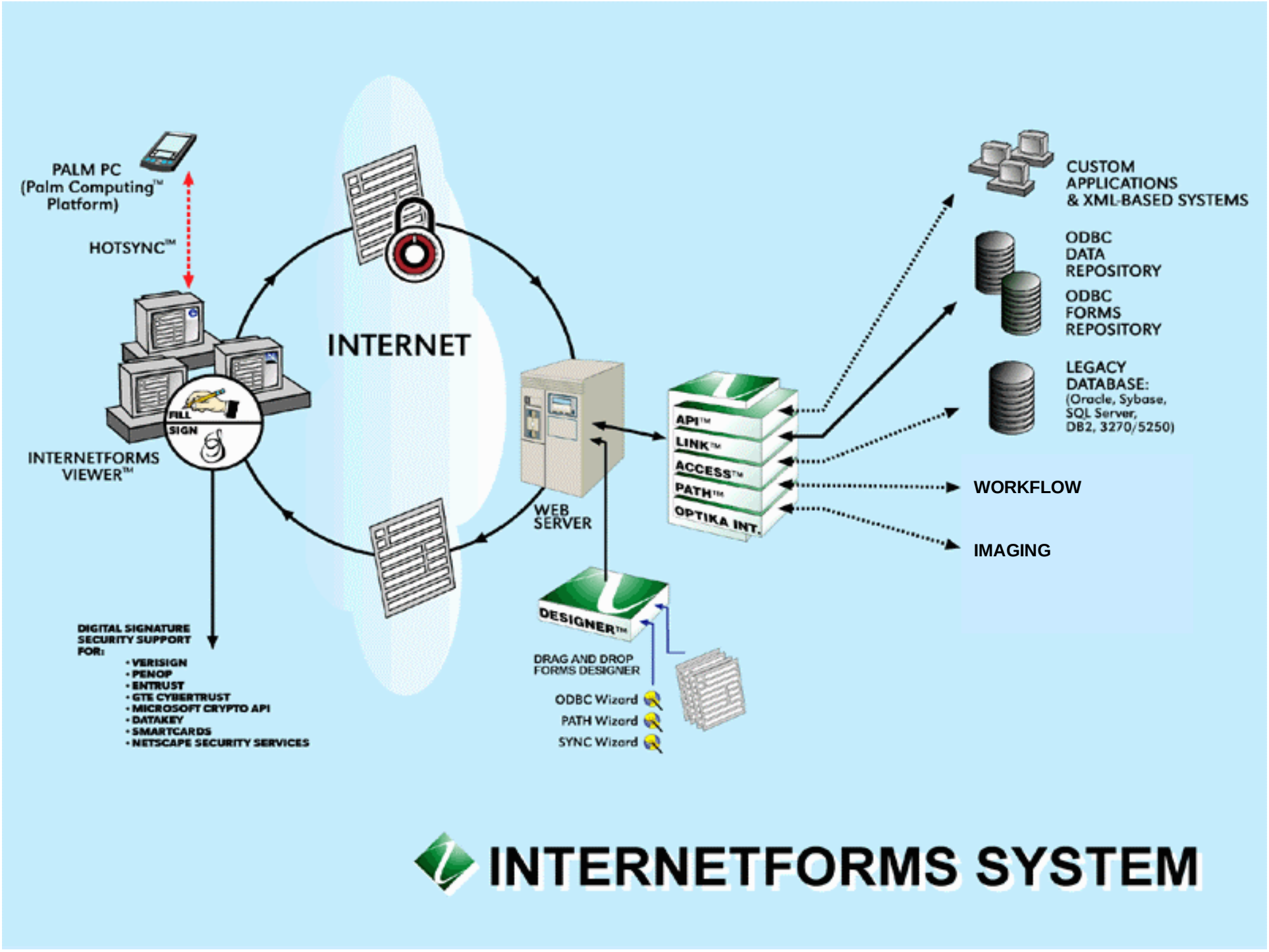
- Rich computation support
  - Extensive validation ensures a proper submission
  - Ability to guide users through a form
    - Eases usage burden, makes application intuitive
- Extremely bandwidth efficient
  - Built-in compression makes for tiny file sizes
    - e.g. typical 8.5 x 11 page approx. 10Kb
- Automated browser update *(Preview release*)
  - Server-based tools allow auto-setup/versioning
  - Seamless, transparent delivery of functionality
  - Minimizes distribution/deployment issues
  - Current download approx. 2Mb and shrinking

Server Capabilities

- ODBC support
  - GUI tools for mapping elements to a DB on submit
  - Ability to pre-populate a document based on a query
  - Ability to dynamically build query responses
- Lightweight routing
  - Email rules encoded into XFDL
  - Relies on SMTP server
- Workflow/Imaging support
  - Through key partners focused on these areas
  - Best of Breed approach coupled with tight integrations
- Commerce Engine coming soon!

Product Extensibility

- Open set of XFDL-handling APIs
  - Provides for data insertion, extraction, structure manipulation, document assembly, signing, verification
  - Used for integrating into various third-party products
  - Multi-platform support (Win32, Solaris, Linux and more)
    - Java API available under Win32
- Client-side extensions through Java
  - Custom classes bundled with document as attachments
  - Dynamically extracted and loaded when form is accessed
  - Optionally part of base install (ie not in document)



INTERNETFORMS SYSTEM

In conclusion...

- Business documents are records of commercial events not just vehicles for data collection.
- Most existing technologies (HTML, Java, EDI, etc…) do not preserve the context of a transaction.
- XFDL is an XML based language designed to replicate complex business documents.
- XFDL is document/programming language hybrid designed to capture transaction context.

Contact us!

Joe Volpe: 818-222-2322

Sheldon Foisy: 888-517-2675 x129

Jason Nadeau: 925-246-7418

Jason Nadeau, Senior Systems Engineer
UWI.Com

Copyright UWI.COM - All Rights Reserved